

ISSUE 2 · JANUARY 2022

THE BUZZ

Newsletter of the British Bee Veterinary Association

Welcome!

CHRIS PALGRAVE, EDITOR

Happy New Year and welcome to the second issue of The Buzz! As I pull on my boots and head out into the frosty morning, trailing plumes of breath, I picture my honeybee colonies clustered tightly and enduring winter's chill. All around, bumblebee and solitary bee queens will also be hibernating in the earth, vegetation, and various crevasses, patiently waiting for spring to arrive. However, the world is not as dormant as it first appears. Here in mid Devon, scattered tufts of daffodils are already in flower, willows are laden with catkins and the first lambs are bounding across the fields opposite my house. Before we know it, honeybee workers and early bumblebee queens, like the buff-tailed bumblebee, will be out in force, searching for sources of early pollen to feed their expanding brood nests in preparation for the spring blossom.

In this issue, we also have the great pleasure of meeting Laura Higham of Vet Sustain and hearing about her tremendous work supporting change for a greener future for our profession.

As always, I would love to hear from you and see some photos of your bee-friendly areas, information displays and various green activities. Please find our contact details on [page 8](#).



FROSTY JANUARY SUNRISE, MID DEVON

This issue:

Welcome

[PAGE 01](#)

Bee vaccination - a step closer

[PAGE 02](#)

A note about swarming

[PAGE 03](#)

Introducing Vet Sustain

[PAGE 04](#)

Thermoregulation in the honeybee colony

[PAGE 05](#)

The buff-tailed bumblebee

[PAGE 06](#)

Plant file: Willow

[PAGE 07](#)

Bee bookshelf: Bumblebees - An introduction

[PAGE 08](#)

Information and contact

[PAGE 08](#)



Bee Vaccination - a step closer

SUZETTA CAMERON, BBVA TREASURER

Insects do not have antibodies. In the past, it was assumed that they could not become immune to acquired disease and could only use innate defence mechanisms to fight pathogens. However, in recent times, it has become understood that insects can acquire immunity to disease and transfer this to their offspring. This is important as it would seem that bees can naturally 'vaccinate' their offspring. They do this through a protein called VITELLOGENIN.

Vitellogenin (VTG) is a protein molecule classified as a glyco-lipo-protein. The synonymous term is used for both the gene (Vg) and the protein it expresses. VTG is an egg yolk pre-cursor protein found in females of almost all oviparous species including fish, reptiles, birds, monotremes, amphibians and most invertebrates.

All worker bees are female, similar to the queen bee, but sterile. They have the genetic capability to produce VTG, but no use for it in egg yolk production. However, they have adapted to use it for many other important functions, such as a food reserve, to synthesise Royal Jelly (queen food), prolong bee lifespan (by scavenging free radicals) and as a hormone that affects foraging behaviour.

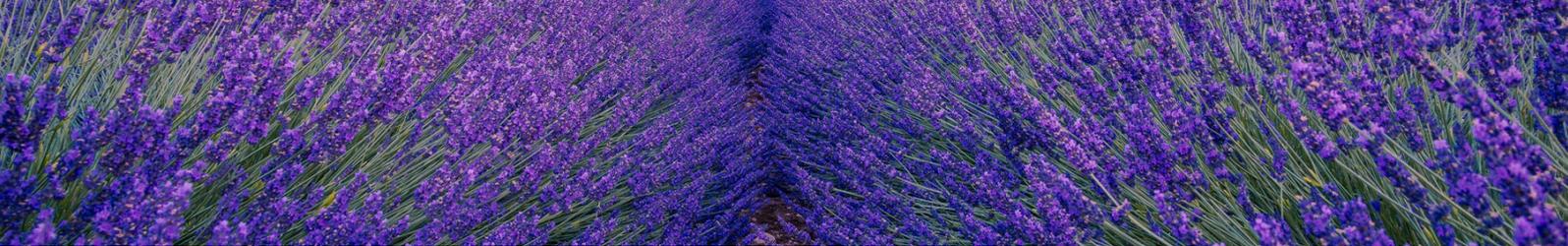
Scientists at Arizona State University, The University of Helsinki, The University of Jyväskylä and The Norwegian University of Life Sciences published a paper revealing just how bees are able to "vaccinate" their young. The queen bee spends most of her life in the hive laying eggs. She is fed with food brought into the hive by forager bees. The forager bees will pick up bacteria and other pathogens with the nectar and pollen they collect, which are fed to the queen. They are digested and stored in the queen's fat body where they bind to VTG. The VTG/pathogen molecule is then deposited in the eggs and therefore the young bees already have a highly specific primed immune system to the bacteria that their mother consumed.

Researchers used the honey bee (*Apis mellifera*) and showed VTG binds to the Gram-positive bacterium *Paenibacillus larvae* (which causes American foulbrood) and the Gram-negative bacterium, *Escherichia coli*. They showed that VTG is required to transport pieces of bacterial cell wall (the immune elicitors) into the eggs. They found that there may be a binding preference for Gram-positive bacteria and this could be important as another notifiable disease, European foulbrood, is also caused by a Gram-positive bacterium, *Melissococcus plutonius*.

The researchers also speculate how this important discovery could be utilised to help the honey bee. This knowledge opens a potential pathway to produce a natural, edible vaccine. VTG transfer of pathogenically inactive bacteria could be used to elicit a highly specific trans-generational immune priming (TGIP). With a loss of over half the numbers of managed honey bee colonies in the US in the last 60 years, this research may at last offer some hope for these vital pollinators.

REFERENCE:

Salmela H, Amdam GV, Freitak D (2015) Transfer of Immunity from Mother to Offspring is Mediated via Egg-Yolk Protein Vitellogenin. *PLoS Pathog* 11(7): e1005015. doi:10.1371/journal.ppat.1005015



The (birds and the) bees; a note about swarming

CHRIS PALGRAVE

The only way a honeybee colony can naturally replicate is to divide itself into two parts through the process of swarming. This typically occurs in late spring/early summer when the colony is large, there is plenty of honey stored from the spring flowers, the weather is good and space inside the hive is starting to get a little short. The worker bees slim down the existing queen and reduce her egg-laying in preparation for flight, while at the same time raising a number of new queens. Selected female larvae are fed huge amounts of royal jelly and develop into queen bees, rather than workers. Once these new queen cells are capped (sealed) for the final part of their development, the existing queen leaves the hive with around half the workers to find a new home (i.e. they swarm). They leave behind them a strong colony with plenty of food stores, lots of brood (larvae) and a group of new queens soon to emerge. The first queen to emerge will usually kill any others while they are still in their cells (by stinging them through the wall). Should two queens meet face-to-face they will fight until only one survives. The new queen will mature, mate and start laying over the coming weeks.

Meanwhile, the swarm with the original queen congregates nearby, often clustering on a branch or fence post (see photo to right), while 'scout bees' look for a new home. Once a range of potential sites have been identified and assessed, a quorum is reached and the swarm moves en masse into its chosen home. This may be a hollow tree cavity, empty hive, compost bin, post box or similar space... the process by which bees select a new home is fascinating, but a subject for a future issue!

For many beekeepers, the prevention and control of swarming is one of their most important activities. While swarming is a natural process, it significantly reduces the amount of honey produced by a colony. Swarms can also be a nuisance, not only causing panic to the uninitiated public, but their removal can be complex and costly if they establish themselves in an inconvenient location (e.g. cavity wall, chimney, loft space).

**"A Swarm In May
Is worth a load of
hay;
A swarm in June
Is worth a silver
spoon;
A swarm in July
Is worth not a fly."**

PROVERBIAL BEEKEEPERS'
SAYING
(C. MID 17TH CENTURY)



HONEYBEE SWARM IN A PEAR TREE



Introducing Vet Sustain

**Vet
Sustain**

LAURA HIGHAM. DIRECTOR AND SECRETARY, VET SUSTAIN

Our world leaders recently gathered at COP26 in Glasgow. NGOs, activists and many passionate members of the veterinary community made the pilgrimage to the summit's 'Green Zone', taking the opportunity to lobby those in power on the importance of meaningful and urgent climate action. Millions more of us followed the event from home, hoping for commitments from our leaders that will secure a greener, just future for humanity.

Regardless of the outcomes of the conference itself, the activism and news coverage around the summit demonstrated the swell of sustainability awareness across the world, including amongst members of our professions. An awareness of the real and present danger of a climate changing world. And an awareness – thanks to COVID-19 - that encroaching upon natural habitats and exploiting other species in our shared environment have repercussions that ultimately hurt us. I helped to set up Vet Sustain with a band of like-minded colleagues in 2019, to inspire and enable our professions to address the interconnected challenges of climate change, biodiversity loss, public health threats and animal welfare issues. Our research corroborates [findings of the BVA](#) that veterinary professionals care deeply about sustainability issues - but we lack the knowledge and skills to turn this into meaningful action. At Vet Sustain, we are working hard as volunteers to fill the gaps – developing tools, training courses, discussion forums and free resources for veterinary professionals, and building partnerships with veterinary institutions and businesses to drive sustainability initiatives with broad reach. As a new not-for-profit social enterprise, we want to support change for a greener future for our profession.



VET SUSTAIN COMMUNITY
MASTERMIND WORKSHOP AT
LONDON VET SHOW 2019,
PHOTO CREDIT: LAURA HIGHAM

Working in tandem with like-minded individuals, organisations, businesses and associations is of great importance to us. Considering the many alignments between Vet Sustain and BBVA, and the importance of bees and other pollinators to the environment and food security, we would love BBVA members to engage with us. If you are interested, please check out [our website](#), download our [Greener Veterinary Practice Checklist](#), subscribe to our [newsletter](#), and consider [sending in an article or case study](#) from your practice to showcase your sustainability efforts. We'd love to hear from you!



Thermoregulation in the honeybee colony

JOHN HILL, BBVA PRESIDENT

A honey bee, like all insects, is poikilothermic (cold blooded). Its body temperature is dependent on the ambient temperature. If a bee is caught out in the open on a cold day or becomes wet then its body temperature drops until it cannot move and will likely die.

A colony of bees in a hive, however, behave like a mammal and maintain a constant temperature. If you place a thermometer inside a hive, you will find that the temperature reading stays constant at 35°C night and day, whether on the coldest day or warmest day. The reason for this precise regulation is that developing brood (larvae) going through metamorphosis in their cells will only develop properly at 35°C. If the temperature drops a few degrees then the brood will not develop properly or die.



How is this precision achieved? If the temperature outside starts to drop then the bees will react by vibrating their powerful wing muscles to generate heat. They are able to disengage their muscles from the wings to achieve this. Only a percentage of the bees do this, not all the bees in the hive. They are known as 'heater bees' and can be seen using a thermal imaging camera.

If it is a warm day and the temperature outside rises, then the bees initiate cooling procedures such as fanning their wings at the entrance to expel warm air. If the temperature continues to rise, then one group will fan outwards at one side of the entrance and another group will fan air inwards on the other side to create a through draught. As this is going on, workers are also fanning over the nectar-filled cells and combs to increase evaporation of water from the nectar which assists with cooling.

Communication is so precise within the colony that 35°C is maintained through the day and night and in different weather situations. A remarkable adaptation that is so analogous of a mammalian body

WE ARE GRATEFUL FOR THE GENEROUS SUPPORT OF OUR SPONSORS:





The buff-tailed bumblebee

CHRIS PALGRAVE

Of the 270 species of bee in the UK, only one is the honeybee. In this issue, we are going to meet another of the 24 bumblebees, the buff-tailed bumblebee (*Bombus terrestris*). It is one of the most common bumblebees in the UK (one of the 'big seven' species you are likely to encounter). It is also one of the first to emerge from hibernation in February. In some parts of southern England, it may even have a brood cycle over winter. They nest underground in old rodent burrows (*terrestris* = of the earth).

Buff-tailed bumblebee queens are the largest in the UK. They have buff-orange hairs throughout their white tails, as well as a single yellow band on the thorax and one on the abdomen. The tails of worker and male buff-tailed bumblebees are much whiter, but most have a thin line of orange-buff hairs between their white tail and the adjacent black band, which can help differentiate them from white-tailed bumblebee (*Bombus lucorum*) workers/males, which look very similar.



THE BUFF-TAILED BUMBLEBEE (*BOMBUS TERRESTRIS*)

PHOTO COURTESY OF THE BUMBLEBEE CONSERVATION TRUST
BUMBLEBEECONSERVATION.ORG

"The hum of bees is the voice of the garden."

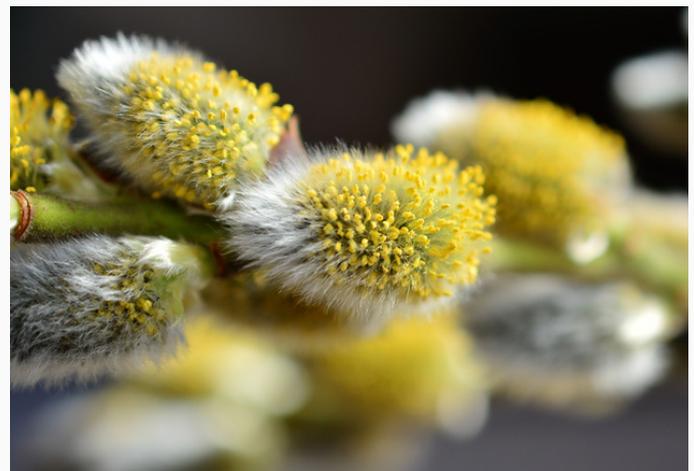
ELIZABETH LAWRENCE
(1904-1985)



Plant File: Willow (*Salix* spp)

CHRIS PALGRAVE

As the days lengthen and temperatures begin to gradually rise, honeybee queens increase their rate of egg-laying. The winter worker bees, who have carried the colony through the cold, dark months, have one last job to do at the end of their long lives: They must raise the first generation of new spring bees. Building bodies requires plenty of protein and bees are no exception. As soon as it is warm enough to fly, worker bees will go in search of pollen (protein) to feed their growing larvae, as colonies rapidly expand in readiness for the spring blossom. Willows (*Salix* spp.) are members of a large family of trees bearing catkins; these are an important source of pollen early in the year (January to March). Catkins are specialised cylindrical flowers with few or no petals. Willows are dioecious (male or female) and the catkins of male trees produce abundant pollen. The furry silver-grey male catkins of the goat willow (*Salix caprea*) resemble cats' paws (hence the alternative name, 'pussy willow'). These turn yellow once ripe and the pollen is visible.



LEFT: THE FURRY PAW-LIKE CATKINS OF THE MALE PUSSY (GOAT) WILLOW
RIGHT: MALE CATKINS ONCE RIPE WITH YELLOW POLLEN VISIBLE

Willow trivia...

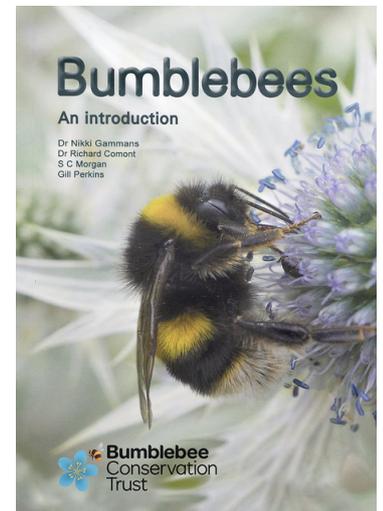
Crosses made of willow (also called 'palm') were worn or hung in churches and homes on Palm Sunday as a protective symbol. Similarly, willow twigs were placed among vegetables and crops to protect them. However, in some parts of the UK, willow wood was considered unlucky and rarely used as it was traditionally the wood from which gallows were made. The bark contains salicin, which is metabolised to salicylic acid by the liver. This is closely related to aspirin (acetylsalicylic acid), which explains the use of willow bark preparations in traditional human medicine as an anti-inflammatory and analgesic. Finally, the willow used to make cricket bats is a particular species, *Salix alba* 'caerulea'; the 'white willow' or 'cricket bat willow'.



The bee bookshelf: Bumblebees - An introduction

CHRIS PALGRAVE

This richly-illustrated, beautifully-produced guide provides a fascinating introduction to the world of Britain's 24 species of bumblebee. It covers everything from bumblebee biology and anatomy to their ability to 'buzz pollinate'. There are descriptions of the different life cycles and nesting sites, flower preferences and distribution maps, and hundreds of annotated photographs to help you identify the queens, workers and males of each species. The authors also discuss declining bumblebee populations and how to record sightings, as well as how to create habitats to encourage and support them. Published by the [Bumblebee Conservation Trust](#) (RRP £10), this book deserves a place on the shelf of anyone with an interest in these iconic, invaluable and charismatic members of our gardens and wild spaces.



The British Bee Veterinary Association

The British Bee Veterinary Association (BBVA) was launched in 2015 in response to an increased demand for bee expertise within the veterinary profession. We host multiple educational events each year and attend a number of veterinary conferences. The BBVA also runs the very successful [Bee-Friendly Practice Scheme](#).

For more information on membership or becoming a Bee-Friendly Practice, please visit: www.britishbeevets.com or email BBVA President, John Hill, at: president@britishbeevets.com.



Editor: Chris Palgrave

Chris is a beekeeper and veterinary surgeon living with his family in the Exe Valley in Devon. He is a member of [Exeter Beekeepers](#) and writes regularly for the veterinary and beekeeping press, including a monthly column in [BeeCraft](#) magazine. Please send any comments, suggestions or contributions to buzz@britishbeevets.com.

